



Designing for Children

- With focus on 'Play + Learn'

Assessing playfulness of a toy play interaction:

A research with differently abled children with communication challenges

Aakash Johry, Department of Industrial Design, Eindhoven University of Technology, the Netherlands, johry.aakash@gmail.com

Ravi Poovaiah, IDC School of Design, Indian Institute of Technology Bombay, India, ravi@iitb.ac.in

Abstract: The present paper looks at the historical development of playfulness from a stable personality trait of the child to a multi-dimensional, contextual construct with a set of defining dispositional characteristics. A case study at a special school in Mumbai, India is presented where observational data of preschool children having intellectual disability (ID) is used to assess playfulness of individual toy-play interactions by adapting the recent playfulness construct by Sanderson (2010) in her Project Joy Playfulness Scale (PJPS). The findings identify 'Active engagement' as the most useful and objectively definable dimension to assess playfulness of a toy play interaction episode, measured through a set of qualitative and quantitative indicators. 'Joyfulness' becomes supplementary to assessing playfulness, found assessable only in certain conditions. While 'Social connection' dimension is found to be independent of the context representing a stable-personality trait of children, 'internal control' dimension can be controlled in the context of research design. The paper takes a step towards much needed operationalization of playfulness construct as an assessment tool useful to study the effect of design interventions, for children with or without communication difficulty. Some possible future directions for further development of playfulness assessment as a scientific scale are discussed.

Key words: *Playfulness, assessment, special needs, toy interaction.*

1. Introduction

Play has been found to play a critical role in evolution, being one of the fundamental behaviours exhibited by humans and animals alike (Burghardt, 2014). There has been a considerable body of research from varied fields like psychology, sociology, neuroscience, anthropology and education science, acknowledging the significance of child's play on his development and learning. Being associated with different developmental perspectives including social, cognitive and emotional development, play has been seen both as a

medium and a condition for learning (Fromberg & Bergen, 2015). Whitebread et al. (2017) published a review report focusing on underlying psychological processes and mechanisms involved in child's playful behaviour leading to learning. Play as an instrument of development gains even more prominence in the context of differently abled children, as the teachers and parents are focused on their deficits. While this discussion has rightfully brought attention of educators, parents and policy makers, encouraging integration of play in the daily lives of children, the treatment of play primarily as a vehicle of development undermines the understanding of play in its own right, or what would be called as 'play for its own sake'. Sutton-Smith (1997), whose work is regarded as one of the most influential in the 20th century in guiding discourses on play, was among the first to acknowledge the heavy adult-driven development agenda of play, calling it as the 'rhetoric of play as progress'. Indeed, children indulge naturally in play without caring for learning or development. Hence, it becomes important to understand the nature and purpose of play as intrinsic to the activity, and not for external goals. More recent play studies use the interpretive approach which locates the meaning and purpose of play in itself and its inherent creativity, thus focusing on the non-instrumental nature of play (Meire, 2007). However, explicit conceptualizations and definition of play still remains to be as elusive as when it was acknowledged by Sutton-Smith (1997) in his book, *The Ambiguity of Play*. Within this broader challenge of defining play, it becomes difficult to assess play from other activities. The discourse on looking at dispositional characteristics for defining and operationalizing play has led to coining of the term 'playfulness'.

The present paper briefly presents the historical development of the construct of play and playfulness in inter-disciplinary research, leading to existing frameworks which attempt to define and assess play. The existing theory is analysed to identify and acknowledge the role of context in affecting playfulness. This paper builds upon a recent playfulness construct by Sanderson (2010) and his proposed Project Joy Playfulness Scale (PJPS), proposing an assessment framework which could be used to measure playfulness of individual toy-play interactions, acknowledging the context. This framework has been developed based on reflections from a case study of a special school in Mumbai, India where empirical observational data of preschool children having intellectual disability (ID) was used to assess playfulness of individual toy-play interactions. Such framework is important from the perspective of a play designer or researcher, since presently there is an absence of assessment framework to measure the effect of design interventions on observed playfulness during a play activity or interaction.

2. From play to playfulness: A historical overview

While play has been formally studied or researched much later, it has always been a part of human history, seen in the carvings and archaeological artefacts from the pre-historic times. An interesting narrative emerges by looking at the historical development of theories of play showing how play as a concept has been shaped to support the dominant perspectives of changing socio-cultural and political contexts, briefly discussed as follows.

Based on the order of occurrence, Mellou (1994) classified play theories as: classical (pre-world war 1) or modern (20th century). It is worth noting that most of the classical play theories have attempted to determine the purpose of play outside the play activity, as reviewed by Saracho and Spodek (1995). This purpose varied from expending surplus energy (Schiller, 1875) to regenerating the energy lost in work (Lazarus, 1883), and from practicing skills to prepare for future survival (Groos, 1898, 1901) to reproducing past cultures of their race (Hall, 1905). While the Modern play theories also focused on purpose of play, they identified the purpose from the form and content of play itself. e.g. purpose of make-believe play was seen as socializing children to adapt to their culture and norms (Mead, 1934), to try out and modify various social roles (Bateson, 1955), and to experience and master reality by creating model situations (Erikson, 1950). This focus of seeing the purpose of play in child's development can be seen in most of the significant modern play theories, from cognitive development (Piaget, 1962; Vygotsky, 1967) to emotional development (Erikson, 1950) and social development (Bateson, 1955; Mead, 1934). Parallely, there has been a strong discourse on identifying typologies of play based on the theoretical development. Hughes (1996) looked at the existing classifications of play, further breaking them into fifteen types. Contemporary play theorists like Sutton-Smith (1986, 1997) have shifted from trying to find the purpose of play in development to giving a critical commentary on child's play using the seven rhetoric of play, and touching on aspects like power and identity in play, use of toys, etc. Some of the other significant discourses in the domain of play include emergence of peer culture through play (Aydt & Corsaro, 2003; Corsaro, 2005; Evaldsson & Corsaro, 1998), role of gender in play (Bhana, 2016; Blatchford, Baines, & Pellegrini, 2003; Karsten, 2003; Trawick-Smith, Wolff, Koschel, & Vallarelli, 2014), etc. With the advances in technology, a number of novel applications of play have emerged like Media-based learning, Digital game based learning, etc. (Gee, 2003; Prensky, 2003). Van Eck (2006) elaborates on how digital games can playfully engage children in learning using the well-established learning tools of situated cognition, anchored instruction, feedback, etc. With all the progression in play theories and its application, what seems to be consistent is the focus on play and its relationship with development has been a key theme.

On the other hand, there is still a lack of a standard definition of play, partly due to its multi-disciplinary nature, as varied disciplines have all looked into play from different perspectives and purposes. Moreover, the very nature of play makes it difficult to define, as noted by Harker (2005), "Playing has no identity (being) itself, except as a secondary characteristic of its conceptual differentiation (becoming) - the identity of difference" (p.16). Indeed, it is the implicit characteristics which need to be identified that lead to an activity becoming play, a gap which remains unaddressed in most of the early theories. Contemporary play theorists have acknowledged the need to define play as multi-dimensional, using a combination of defining characteristics (Pellegrini & Smith, 1998; Smith & Vollstedt, 1985). Rubin, Fein, and Vandenberg (1983) made a significant stride while talking about different paradigms of play, including play as disposition, which looks at child's approach in terms of motivation and orientation towards the activity. They also proposed the following dispositional characteristics of play: 1) activity being intrinsically motivated, 2) play activity being focused on the means versus the ends, 3) player being actively engaged in the activity, 4) going beyond the functional properties of an object, 5) play behaviours being representational versus instrumental in nature, and 6) play not being constricted by external rules. Bundy (2000) gave a significant conceptual framework for understanding play by placing it on a continuum of activity that can be more or less playful depending on the number of dispositional criteria that have been met, rather than two discrete states of play and non-play. The progress in the discourse of looking at dispositional characteristics for defining and operationalizing play has led to coining of the term 'playfulness', first used by Lieberman (1965). The notion of playfulness has been used lately in accordance with the notion of play, however they are semantically different (Lester & Russell, 2010; Youell, 2008). While play refers to the behaviour manifested during the activity, playfulness refers to the unique internal predisposition child has to engage in play or his desire to play. Perhaps, being able to assess playfulness would be more useful in differentiating play from other activities.

3. Playfulness and special needs

While the play literature in relation to children with special needs is relatively limited, the shaping of discourses on play and playfulness over the years, as discussed in the earlier section, shows similar influences for differently abled children. In fact, the instrumental role of play in a special child's development is acknowledged even more prominently, as it can become an engaging and effective medium of learning, when the conventional methods are not suited. Johry and Poovaiah (2014) found that almost all the play situations in a special school in Mumbai, India were centred around development of

differently abled children, and free, unstructured play was hardly present. Brodin (2005) corroborated this pattern stating that almost all literature on play and children with disabilities emphasizes on learning or training different skills as an important aspect. This approach on play is also reflected in number of research studies that have focused upon play skills and abilities of differently abled children, often using a comparative approach with their typical peers (e.g. Case-Smith & Kuhaneck, 2008; Malone, 2006, 2009). Another significant research direction in the domain of play and special needs has been on making play spaces more accessible and removing barriers, however most of the existing research instruments on accessibility do not look at the subjective experiential aspect of the recreational spaces (Gray, Zimmerman, & Rimmer, 2012). While all these discourses are relevant, there is also a need to understand the dispositional character of play that makes it fun and engaging. Playfulness as a construct addresses this concern and several playfulness assessments have been developed over time, usable for typical and differently abled children, as discussed in the following section.

4. Playfulness: stable personality trait v/s context dependent

With the emergence of playfulness as a construct, a number of researchers have attempted to characterise it based on different set of dispositional criteria. Lieberman (1965) initially defined the dispositional characteristics based on play abilities of the children, comprising of: physical spontaneity, social spontaneity, cognitive spontaneity, manifest of joy and sense of humor. Over the course of time, the focus shifted from play abilities to child's play style based dispositions, resulting in dispositional characteristics like intrinsic motivation, non-literality, means v/s ends, active engagement, positive affect, etc. (e.g. Bundy, 1997; Rubin et al., 1983; Smith & Vollstedt, 1985). However, all these theories seem to confirm to playfulness as a uni-dimensional construct which is a representation of a stable-personality trait of the child. Based on these theoretical developments, some of the widely used playfulness assessment scales have been developed like Children's Playfulness Scale (CPS: Barnett, 1991), Child Behavior Inventory of playfulness (Rogers et al., 1998) and Test of Playfulness (ToP: Bundy, 2000). These assessments also focus on identifying playful personality in a child by including higher-order processes like divergent thinking, humor, and creativity, as well as culturally driven play skills like telling jokes, sharing toys, etc. Having shown strong psychometric properties, these scales have established their validity and reliability among typical children as well as special children with recommendations for adaptation (Bundy & Clifton, 1998; Okimoto, Bundy, & Hanzlik, 2000). While treatment of playfulness as a stable personality trait may be useful from the perspective of other disciplines like

psychology and sociology, but design practitioners are more interested in the component of playfulness which is affected by the context, including the designed play artefacts and spaces. Studying this contextual component would require the ability to observe the effect of individual toy-play interactions.

Recent developments on theory of playfulness have been more useful in this regard which have looked at playfulness as a dynamic entity which is context dependent. For instance, Sanderson (2010) defines playfulness as: “the expression of the child’s drive to freely and pleurably engage with, connect with, and explore the surrounding world”. There seems to be an acknowledgement of the role of the surrounding context which would affect child’s disposition. She proposed an assessment called Project Joy Playfulness Scale (PJPS: Sanderson, 2010) based on a multiple dimensions, namely active engagement, joyfulness, social connection and internal control. This scale tries to segregate the attitude to play from the learned play-skills which could be culture-dependent (e.g. telling jokes, sharing toys, saying sorry) as seen in the earlier scales. While this scale seems to be more suited for design practitioners for studying the effect of contextual factors on playfulness, PJPS can’t be directly adopted since it is not designed to measure playfulness of individual play episodes with a specific toy or activity, which might be the intention when making design interventions. This scale measures playfulness over a period of time (two weeks) involving play with a group of toys, and has been designed to serve a different objective. The present study attempts to address this bridge this gap by adapting the framework of PJPS (Sanderson, 2010) such that it can be used to compare playfulness between individual play episodes, useful for interventional studies, as discussed in the following section.

5. Case study: Assessing toy play interaction for differently abled children

This section reports the case of an extensive, qualitative study conducted at a special school in Mumbai, India involving assessment of playfulness of individual toy-play interactions. While the reported study is a part of a larger research project and beyond the scope of this paper, the study is briefly described, focusing on learnings in assessment of playfulness, as follows.

5.1 Study design

The objective of the larger exploratory study was to understand if and how design characteristics of play artefacts/activities affect observed playfulness of the differently abled children at a special school in Mumbai (Johry & Poovaiah, 2019). Participants (N=12) included 4 girls and 8 boys with mild to moderate Intellectual Disability (ID) in the mental age group of 3 to 6 years. Informed consent was taken from the parents and school

administration for the participation of selected children, with the condition of maintaining anonymity. The study protocols were designed to ensure children's physical and mental safety. Data collection involved capturing toy play interactions of each child using hidden cameras, given access to a wide variety of age-appropriate toys. Using a framework by Kudrowitz and Wallace (2010), two familiar and commonly available toys were selected from each of the play types: sensory, pretend, constructive and challenge-based play. The study was focused around solitary play and sitting/ table-top activities. Each child had access to all toys during the free play sessions lasting to a maximum of 1 hour, in an indoor setting, while researcher stayed present as a silent observer and occasionally as an invited play partner, as shown in figure 1.



Figure 1. Top & front cameras capturing the play activity and child's expression (blurred to maintain anonymity) in a play session

5.2 Assessing playfulness and data analysis

Considering the limited sample size and exploratory nature of the study, a Glaserian grounded theory based qualitative framework (Glaser, 1998; Glaser & Strauss, 1967) was adopted while analysing the huge amount of observational data. The findings would reflect playful patterns in the toy-play interaction of the children.

It is important to note that the objective of the larger study was dependent on being able to determine the different degrees of playfulness found in individual toy-play interactions during the free play sessions. As discussed earlier, this would require defining playfulness as a context-dependent construct. Building upon Sanderson's theory, playfulness was redefined as 'the expression of the child's drive to freely and pleurably engage, connect and explore an object during the play interaction'. While it was not possible to directly use PJPS (Sanderson, 2010) for our purpose, each of the four individual dimensions of playfulness that form the assessment framework for PJPS, were analysed individually. This would imply looking for indicators of active engagement, joyfulness, social connection and internal control, at all the events in toy play interaction of the children during the play sessions. Due to the nature of grounded theory, the constant

comparison technique helped in refining our understanding of how each of these dimensions would vary across the children and across the play sessions, discussed as follows.

5.3 Learnings from playfulness assessment

While the overall results from grounded theory are beyond the scope of this paper, the insights related to playfulness assessment are discussed as follows, corresponding to each of the four dimensions of Sanderson's (2010) playfulness construct.

Social connection: According to Sanderson, this dimension refers to the 'child's cooperative interaction with others and the surrounding world' (Sanderson, 2010). The analysis showed a number of categories which were related and useful for assessing the level of social connection, like interaction with toys, environmental artefacts and facilitator.

Interaction with toys and environmental artefacts comprised of several codes whose frequency and level varied between the participants like level of toy/artefact exploration (how often child explored multiple toys and/or non-play intended objects during the session), order of selecting toys (movement and selection being more orderly or organic and free-flowing), etc. Similarly, interaction with facilitator looked at variation in frequency of codes like seeking attention, verbal communication, playing with facilitator, power dominance with facilitator and mischievous behaviour. Higher instances of all these indicators would reflect that child felt free and safe to connect with facilitator.

Comparison of children's behaviour for these codes showed that the dimension of social connection was dependent on child's individual nature and was a reflection of his/her **stable-personality trait, as it did not vary much between play interactions with different toys.** e.g. one participant seemed to have a more introvert and subdued presence which reflected in her play interactions irrespective of which toy she played with. Also, this behaviour was consistent for all the indicators, i.e. she showed low interaction with facilitator, and also low exploration of environment and toys. On the other hand, couple of participants who were much more expressive and extrovert, showed high instances of each of these indicators without any contradiction.

Active engagement - This dimension refers to the 'child's enthusiastic and complete immersion in an activity' as stated by Sanderson (2010). Active engagement was found to be the **most useful and objectively definable dimension** to assess playfulness, which could be assessed through a set of both qualitative and quantitative indicators.

Quantitative indicators included the duration of play interaction with a particular toy as well as the number of times (frequency) a toy is selected for play interaction. Play

interaction excluded the cases of exploration of toy (holding and checking the toy for a brief duration) and includes only those instances when one or more forms of play like pretend, constructive, etc. were exhibited by the child during the interaction. It was important to consider both frequency and duration because it would help in differentiating those instances which led to long duration episodes from the ones which were short in duration but occurred frequently, thus indicating difference in the nature of engagement. However, to develop a more comprehensive picture, a set of qualitative indicators were also identified. These included instances of boredom which would comprise of facial gestures like yawning and body gestures like dropping of shoulders and child stretching his body, being idle and inactive with toy and constant distraction (seeing around), etc. On the other hand, focused behaviour could be seen through instances of long, undistracted play episodes with a toy. Another qualitative indicator was the degree of intrinsic motivation which would differentiate those instances of play interaction which were initiated and sustained by the child with or without any external triggers or agent. Some of these qualitative indicators would need further operationalization to be able to use them for objectively assessing playfulness.

Joyfulness - Joyfulness addresses the emotional experience referring to the 'child's sense of love, fulfilment, and hope that is expressed with displays of pleasure and exuberance' (Sanderson, 2010). In case of children with communication difficulties, it becomes much more difficult to capture this expression. The present study was based primarily on observation of play sessions, hence joyfulness was assessed using facial expressions by identifying the instances where child expressed joy through smile and laughter, and occasionally through verbal remark. An interesting insight from the analysis showed that **the instances of expression of joyfulness almost always occurred when child interacted with facilitator**. Furthermore, another insight showed that **expression of joy in presence of facilitator was more profound and longer lasting** than the few instances where facilitator was absent. The interaction included child showing the state of play to facilitator, playing with facilitator or offering him to play, seeking help, etc. Infact, three of the children were seen searching for facilitator to share their joy during play interaction e.g. when they started beating the drum. The underlying reason for this relationship could be that expression of feelings is most commonly associated with communication and facilitator's mere presence can give that sense of acknowledgement to the children. It seems that the dimension of joyfulness can't be assessed in play sessions which involve solitary play and don't have a facilitator, as the instances would be too few and not a reliable source of assessing playfulness. More importantly, **joyfulness would not be a reliable indicator of playfulness when comparing play interactions with different**

level and nature of social play. Another challenge in objectively assessing joyfulness was that children would have varying capabilities and their unique ways of displaying emotions, and hence not all instances would be expressed and captured reliably. Hence, joyfulness became a supplementary assessment dimension, often confirming the playfulness seen through active engagement dimension.

Internal control - This dimension refers to ‘the child’s sense of safety, balance, and competence that allows her to comfortably engage with the surrounding world’ (Sanderson, 2010). By the very nature of design of the present exploratory study, the child was free to explore or interact with any of the toys available being subjected to the same condition of free play. Moreover, facilitator was also often perceived as a play partner and did not seem to affect child’s agency in controlling play. In this regard, a high level of internal control was present for all children. However, it is important to note that apart from the control on the overall play context, internal control can also be looked in terms of agency that children had while playing with a toy or activity due to the intrinsic rules of that toy or activity. In the case of present study, challenge-based toys e.g. jigsaw puzzles, shape sorter box, etc. were the most structured, offering least control. Hence, from the perspective of playfulness assessment, **internal control as a dimension could be seen as being controllable by the way play activity and context is defined** for the child.

6. Conclusions

This paper attempts to address the need of defining and assessing playfulness of individual toy play interactions, which is necessary to measure the impact of designed artefacts and other interventions. In this regard, playfulness was defined as a contextual and multi-dimensional construct using support from existing literature and an assessment framework was developed based on learnings from an exploratory case study with differently abled children in a special school in Mumbai. In the studied context, active engagement emerged as the most useful dimension for playfulness assessment, while joyfulness became a supplementary dimension due to the lack of reliability in capturing it, but was used to support the patterns seen in active engagement. Social connection was found to be representative of the static component of playfulness, depending on child’s stable, personality traits and independent of the context or toy. From the perspective of play intervention, internal control emerged as a significant component of playfulness assessment and even modulation, which could be controlled through research design. Heimann and Roepstorff (2018) when studying adult’s experience of becoming playful, concluded that feeling of autonomy seems to be constitutional for the ability to modulate playfulness.

The operationalization of playfulness and its assessment is a significant step which could be used in other research studies where playfulness needs to be compared as a function of environment or context. However, as seen in the learnings, the assessment parameters would vary depending on the user and context and need to be adapted. For instance, joyfulness would be a more useful dimension of assessing playfulness in a social play environment where child has ample opportunities to 'communicate' his feelings, however it is important to note that joyfulness varies as a function of social play, and should not be used to compare play interactions with varying level of social play. Also, the reliability of joyfulness dimension would increase with children who are able to communicate verbally, unlike the participants of the discussed study. On the other hand, some of the qualitative indicators of active engagement like instances of bored and focused behaviour would be more relevant to assess in long free play episodes similar to the sessions in present study. It might be difficult to identify instances of bored and focused behaviour in sessions having smaller duration. Another dimension which would heavily depend on the context or setting is internal control. However, it is also the most controllable dimension through design and hence deserves attention from design practitioners. The dimension of social connection responds to the key discourse in the fields like psychology, sociology, etc. being able to capture the innate personality traits of the child.

There is definitely a scope of further refining this framework and making it more objective. Some of the qualitative indicators discussed in active engagement dimension need to be further refined e.g. indicators of bored and focused behaviour (currently identified by facial and body gestures) need to be listed and if possible, quantified. Integrating physiological tools like wearables which measure electro-dermal activity (EDA) might also be effective in reporting the cognitive engagement aspects, which are not directly observable. Another potent area for future exploration could be exploring the dimension of internal control and social connection as a function of social and material context, and suggesting necessary changes in the assessment procedure to make it more universally applicable. The discussed framework is an initial step towards the operationalization of playfulness construct but the adaptation of Sanderson's (2010) playfulness framework should make it more culturally independent. Furthermore, checking the framework for differently abled children would ensure that the theoretical developments are more inclusive to all kind of users. It is worth noting that defining and assessing playfulness would vary based on the purpose, from understanding playful personality to identifying the role of play based design interventions. Similarly, there will tend to be variations in playfulness assessment based on the studied context and users.

For instance, adults might be able to reflect and self-report the feeling of playfulness (e.g. Heimann & Roepstorff, 2018; Shen, Chick, & Zinn, 2014), while observational and physiological data would be a better reflection of playfulness in children with communication difficulties, as seen in the shared case study. However, differentiating playfulness assessment into trait elements which are stable for a child and state elements which are context dependent would be useful in bridging the operationalization of playfulness. It is important that we adopt a more constructive perspective in appreciating the different approaches to assessing playfulness, to be able to appreciate the complexity and richness of playfulness as a subjective experience manifesting in our daily lives.

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